



A.D. 1865, *4th DECEMBER.*

N<sup>o</sup> 3114.

S P E C I F I C A T I O N

OF

WILLIAM EDWARD NEWTON.

ARTIFICIAL ARMS.

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1866.







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A.D. 1865, 4th DECEMBER. N° 3114.

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### Artificial Arms.

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**LETTERS PATENT** to William Edward Newton, of the Office for Patents, 66, Chancery Lane, in the County of Middlesex, Civil Engineer, for the Invention of “**IMPROVEMENTS IN THE CONSTRUCTION OF ARTIFICIAL ARMS.**” — A communication from abroad by Thomas Uren, of the City of New York, in the United States of America.

Sealed the 15th May 1866, and dated the 4th December 1865.

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**PROVISIONAL SPECIFICATION** left by the said William Edward Newton at the Office of the Commissioners of Patents, with his Petition on the 4th December 1865.

I, WILLIAM EDWARD NEWTON, of the Office for Patents, 66, Chancery Lane, 5 in the County of Middlesex, Civil Engineer, do hereby declare the nature of the said Invention for “**IMPROVEMENTS IN THE CONSTRUCTION OF ARTIFICIAL ARMS,**” to be as follows :—

This Invention relates to various improvements upon an Invention for which I obtained Letters Patent, bearing date April 27th, 1865, No. 1185, and has 10 for its object to construct an artificial arm which is peculiarly adapted to cases of amputation of the fore arm. The Invention will also be found useful for cases in which the elbow joint is paralysed.

The Invention consists, first, in the use of a locking cord or strap for holding up and supporting the fore arm in a fixed horizontal position when 15 required. To this end a cord or strap is firmly attached by one end to the leather or other case which envelopes the upper arm above the elbow. The other end of this cord passes through a guide on the outside of the artificial fore arm, and is provided with a hook whereby it may be permanently attached



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to a pin, bar, or other equivalent device situated near the wrist. By raising up the fore arm and hooking the cord on to the wrist pin the fore arm may be held up for any length of time without fatiguing the elbow joint.

The next improvement relates to the means of opening and closing the fore-finger and thumb. These digits are jointed at their junction with the hand, 5 and are kept closed by the tension of a spring placed inside the artificial hand. This spring is connected to a lever, the end of which projects from the inside of the hand into an opening at the wrist so that a tension cord may be hooked on to it. This tension cord passes outside the fore and upper arm through swivel guides, which give it a certain amount of elasticity, and is secured by 10 its other end to a ring on the shoulder and back strap.

The next improvement consists in the use of a double lifting cord for raising the fore arm. This cord is secured by both its ends to the sides of the fore arm, and passes up through swivel guides or straps on each side of the upper arm. By this arrangement a bow or loop is made in the lifting cord, which 15 passes through a ring or loop at the end of the shoulder or back strap. It will therefore be evident that by putting a strain on the lifting cord by raising the stump of the amputated arm the fore arm will be lifted up. The guides through which the tension cords pass are made moveable on their centres, to which end they are either formed of short leather straps, which are sufficiently 20 flexible for the purpose, or of wires or metal bars mounted on centre pins so that they can work thereon.

The 2nd, 3rd, and 4th fingers are jointed to the hand, and are held in place by a strong spring or springs placed inside the hand, but are capable of being moved on their centres (in order to open the hand) by means of cords which 25 are connected by one end to the back of the fingers, and by the other to the back or shoulder strap or to some convenient part of the artificial upper arm. The thumb and first finger may be made to act in combination with the other fingers by means of a cord as already explained, so that the entire hand, or rather the fingers and thumb thereof, may be opened simultaneously so as to 30 grasp and take up anything.

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**SPECIFICATION** in pursuance of the conditions of the Letters Patent, filed by the said William Edward Newton in the Great Seal Patent Office on the 4th June 1866.

**TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM 35**  
EDWARD NEWTON, of the Office for Patents, 66, Chancery Lane, in the County of Middlesex, Civil Engineer, send greeting.



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WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Fourth day of December, in the year of our Lord One thousand eight hundred and sixty-five, in the twenty-ninth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto  
5 me, the said William Edward Newton, Her special licence that I, the said William Edward Newton, my executors, administrators, and assigns, or such others as I, the said William Edward Newton, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and  
10 lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN THE CONSTRUCTION OF ARTIFICIAL ARMS," being a communication to me from abroad by Thomas Uren, of the City of New York, upon the condition (amongst others) that I, the said William  
15 Edward Newton, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the  
20 date of the said Letters Patent.

NOW KNOW YE, that I, the said William Edward Newton, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the Drawing hereunto annexed, and to the  
25 letters and figures marked thereon (that is to say):—

This Invention relates to various improvements upon an Invention for which I obtained Letters Patent, bearing date April Twenty-seventh, One thousand eight hundred and sixty-five, No. 1185, and has for its object to construct an artificial arm which is peculiarly adapted to cases of amputation of the fore arm.  
30 The Invention will also be found useful for cases in which the elbow joint is paralysed. The means whereby this object is effected are shewn in the accompanying Drawing, in which Fig. 1 represents an external view of the improved artificial arm with the fore arm and hand hanging down; Fig. 2 is a similar view with the fore arm and hand held up by braces or cords in the  
35 manner hereafter explained; Fig. 3 is a sectional view of a fore arm and hand detached; Fig. 4 is a side elevation of the same; and Fig. 5 represents one of the improved arms adapted to the body for use.

The Invention consists, first, in the use of a locking cord or strap for holding up and supporting the fore arm in a fixed horizontal position when



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required. To this end a cord or strap *a* is firmly attached by one end to the leather or other case *b*, which envelopes or forms a socket for the upper arm above the elbow. The other end of this cord *a* passes through a guide *c* on the outside of the artificial fore arm, and is provided with a hook *d* whereby it may be permanently attached to a pin, bar, or other equivalent device *e* 5 situated near the wrist. By raising up the fore arm *f* and hooking the cord *a* on to the wrist pin *e*, the fore arm *f* may be held up in the position shewn at Fig. 2 for any length of time without fatiguing the elbow joint.

The next improvement relates to the means of opening and closing the fore-finger and thumb of the hand. These digits are jointed at their junction 10 with the hand as shewn at *g*, *g*<sup>1</sup>, Figures 1, 2, and 3, and are kept closed by the tension of a spring *h*, Fig. 3, placed inside the artificial hand; this spring *h* is connected to a lever *i*, the end of which projects from the inside of the hand into an opening *j* at the wrist, so that a tension cord *k* may be hooked on to it. This tension cord *k* passes outside the fore and upper arm through 15 swivel or other guides *l*, Fig. 1, which give it a certain amount of elasticity, and is secured by its other end to a ring *k*<sup>1</sup> on the shoulder and back strap.

The next improvement consists in the use of a double lifting cord *m* for raising the fore arm *f*; this cord *m* is secured by both its ends to the sides of the fore arm *f*, and passes up through swivel guides or straps *m*<sup>1</sup> on each side 20 of the upper arm *b*; by this arrangement a bow or loop is made in the lifting cord which passes through a ring or loop *n* at the end of the shoulder or back strap. It will therefore be evident that by putting a strain on the lifting cord *m* (by raising the stump of the amputated arm), the fore arm *f* will be lifted up. The guides *l* and *m*<sup>1</sup> through which the tension cords pass 25 are made moveable on their centres, to which end they are either formed of short leather straps as shewn in the Drawing, and which are sufficiently flexible for the purpose, or they may be formed of wires or metal bars mounted on centre pins so that they can work thereon.

The second, third, and fourth fingers are jointed to the hand, and are held 30 in place by a strong spring or springs placed inside the hand, but are capable of being moved on their centres (in order to open the hand) by means of cords *o*, Fig. 4, which are connected by one end to the back of the fingers, and by the other to the back or shoulder strap or to some convenient part of the artificial upper arm.

The thumb and first finger may be made to act in combination with the other fingers by means of a cord as already explained, so that the entire hand, or rather the fingers and thumb thereof, may be opened simultaneously so as to grasp and take up any object.



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Fig. 6 is an external view of a modification of the artificial arm just described. Instead of the cords  $m$  and  $k$  of Figures 1 and 2, one of which supports the arm and the other serves to open and close the fingers, two cords  $m^2$ ,  $k^2$ , are employed; these cords are attached to the rings  $k^1$  and  $n^1$ , as in the former instance. Fig. 7 shews the mechanism for closing and opening the fingers. It will be seen that the cords  $m^2$  and  $k^2$  are attached to the lever  $o$  fixed to the four last fingers, and they pass on each side over the pullies  $p$ ,  $p$ ,  $p$ . It will now be understood that if tension is put on the cord  $k^2$  it will cause the lever  $o$  to turn on its centre, and thereby open the fingers. If, however, tension is put on the cord  $m^2$  the lever will also be made to move, but in the opposite direction, and thereby close the fingers. Fig. 8 is a sectional view shewing the mechanism for moving the forefinger and thumb; the forefinger is provided with a lever  $o^1$  with its cord, which passes over the two pullies  $p^1$ ,  $p^1$ . The thumb carries a lever  $o^2$  with its cord, which passes over two other pullies  $p^2$ ,  $p^2$ . The three cords which perform the operation of opening the thumb, the forefinger, and the four other fingers are connected together and are united to the cord  $k^2$ . The other three cords which perform the operation of closing the thumb and fingers are also united, and are attached to the cord  $m^2$ . It will therefore be seen that there are two simple cords  $m^2$  and  $k^2$ , one of which is connected to the ring  $k^1$  and the other to the ring  $n^1$ .

Fig. 9 is a sectional view of a modification of the hands just described; in this instance the thumb remains always open by the tension of the spring  $r$ , and there is a cord  $q$  for closing it. In this Figure is also shewn an arrangement for moving the fore joint of the thumb. Two cords  $s$  and  $s^1$  are fixed one to the inside and the other to the outside of this fore part of the thumb, which is jointed to the lower part of the thumb by the hinge  $z$ ; these two cords  $s$  and  $s^1$  are connected to the rings  $k^1$  and  $n^1$ .

Fig. 10 is a longitudinal section of an artificial fore arm of a very cheap construction, and is intended for the use of artisans and persons of limited means. It will be seen that the the four fingers have no motion, and the thumb is kept constantly open by means of the spring  $r^1$ . A cord  $y^1$  is attached to a lever  $o^2$  adapted to the thumb, and is connected by one end to another lever  $u$  placed near the wrist of the hand. To the upper end of the lever  $u$  is adapted a cord  $v$  connected by its opposite end to one of the rings  $k$  or  $n^1$  of Fig. 6. It will now be understood that if tension is put upon the cord  $v$  the other cord  $y^1$  will cause the thumb to close against the forefinger, and when the cord  $v$  is slackened the thumb will be opened again by the force of the spring  $r^1$ .



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Fig. 11 represents a modification of the mechanical arm, the hand being shewn in longitudinal section. This arm is attached to the body by an arrangement of straps, the two extremities of which are connected to two rings  $x$ ,  $x^1$ , which are fixed to the arm. To the ring  $x$  is connected the cord, which is supported upon a pulley  $z$ , and is attached to one end of the lever  $u$ . 5 It will now be understood that if the ring  $x$  is pulled by the shoulder strap the cord  $y$  will cause the arm to turn on the hinge  $t$  in order to raise the fore arm; at the same time it will put in motion the lever  $u$ , to which are connected the cords  $q^1$ ,  $q^2$ , one of which is connected to the lever of the four fingers, and the other to the lever of the thumb. The fingers are held 10 always open by the spring  $r^1$ , which is attached to a cord which connects the two levers. The cord  $y^2$ , which is connected by one end to the ring  $x^1$ , and by the other to some part of the arm, and which slips over the bar of the hinge  $t$ , is intended to open the arm when tension is put on the strap  $c$ , which is attached to the ring. It will be seen in the Drawings that the fingers are 15 in their normal position, and that they can only be closed by applying force to the ring  $x$ .

Having now described the Invention of "Improvements in the Construction of Artificial Arms, and having explained the manner of carrying the same into effect as communicated to me by my foreign correspondent, I 20 claim as the Invention secured to me by Letters Patent as aforesaid, the mode herein set forth of constructing artificial arms, and operating the several parts.

In witness whereof, I, the said William Edward Newton, have hereunto set my hand and seal, the Second day of June, in the year of our Lord 25 One thousand eight hundred and sixty-six.

W. E. NEWTON. (L.S.)

Witness,

J. W. MOFFATT,

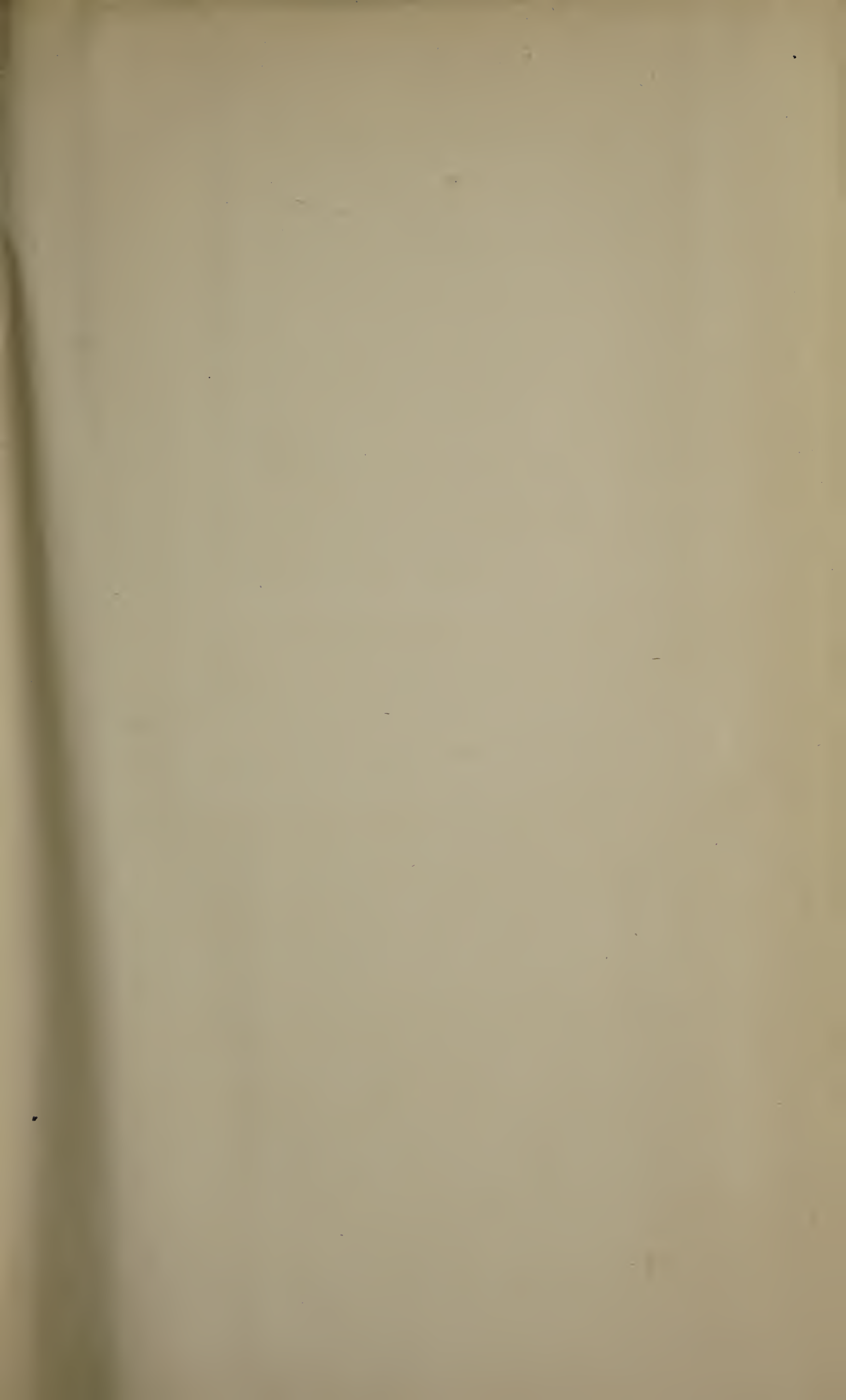
66, Chancery Lane.

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LONDON:

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Printers to the Queen's most Excellent Majesty. 1866.

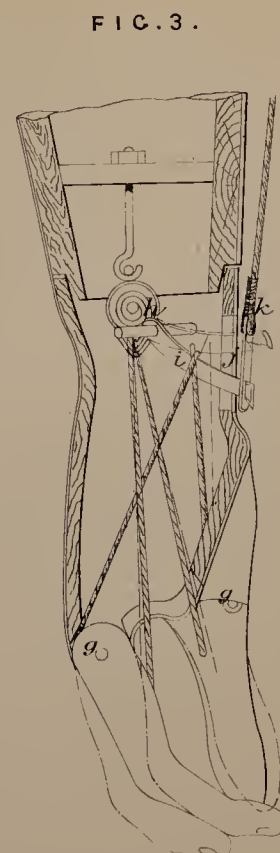
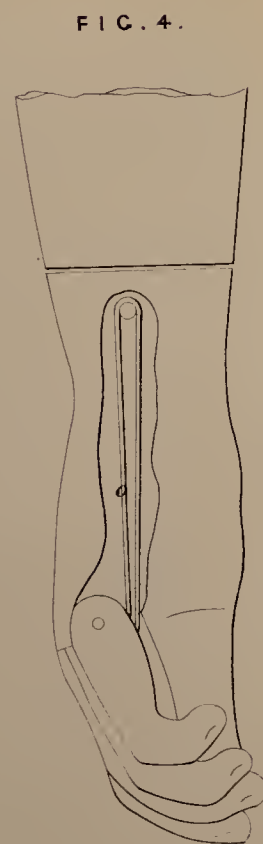
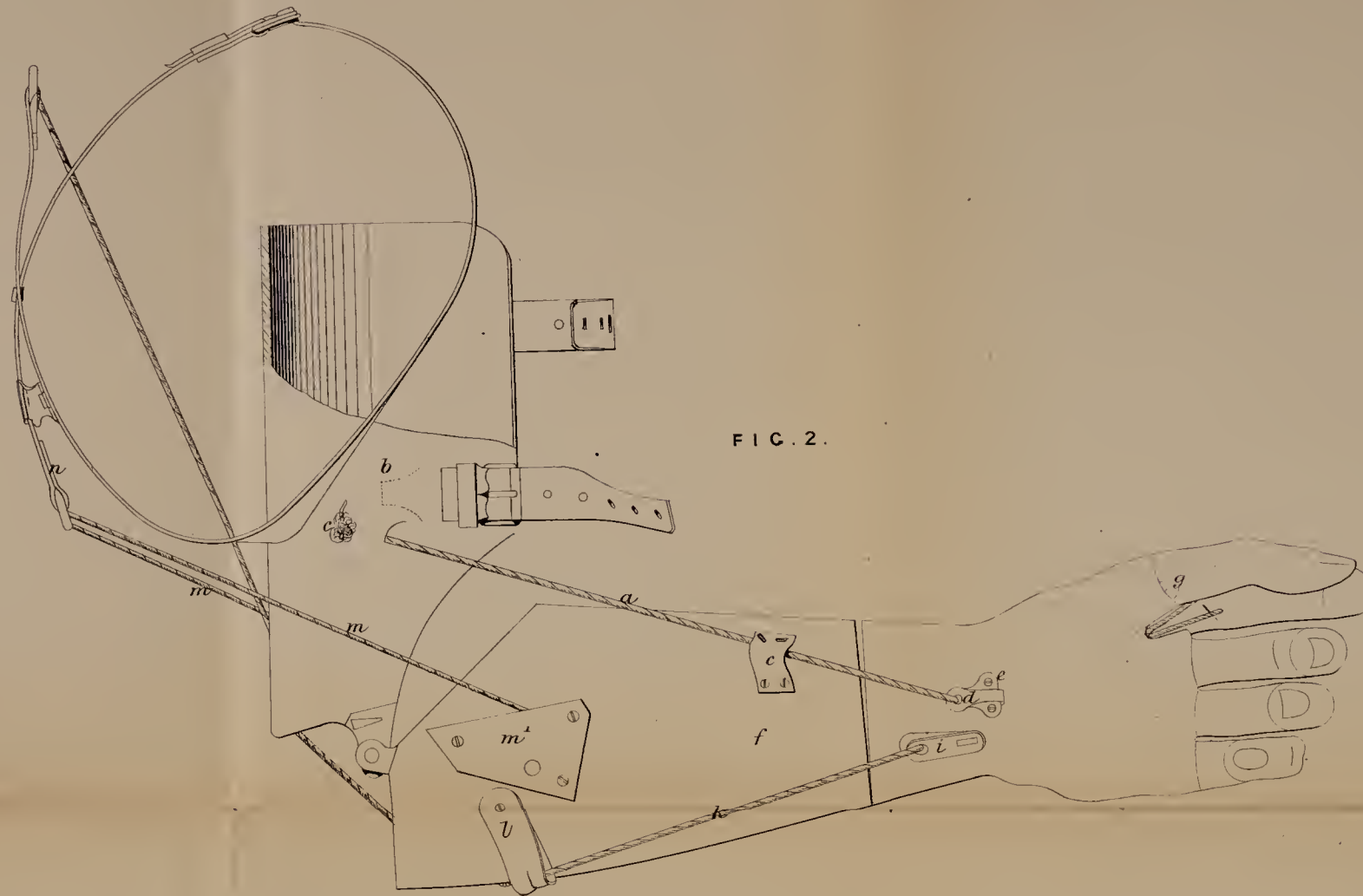


















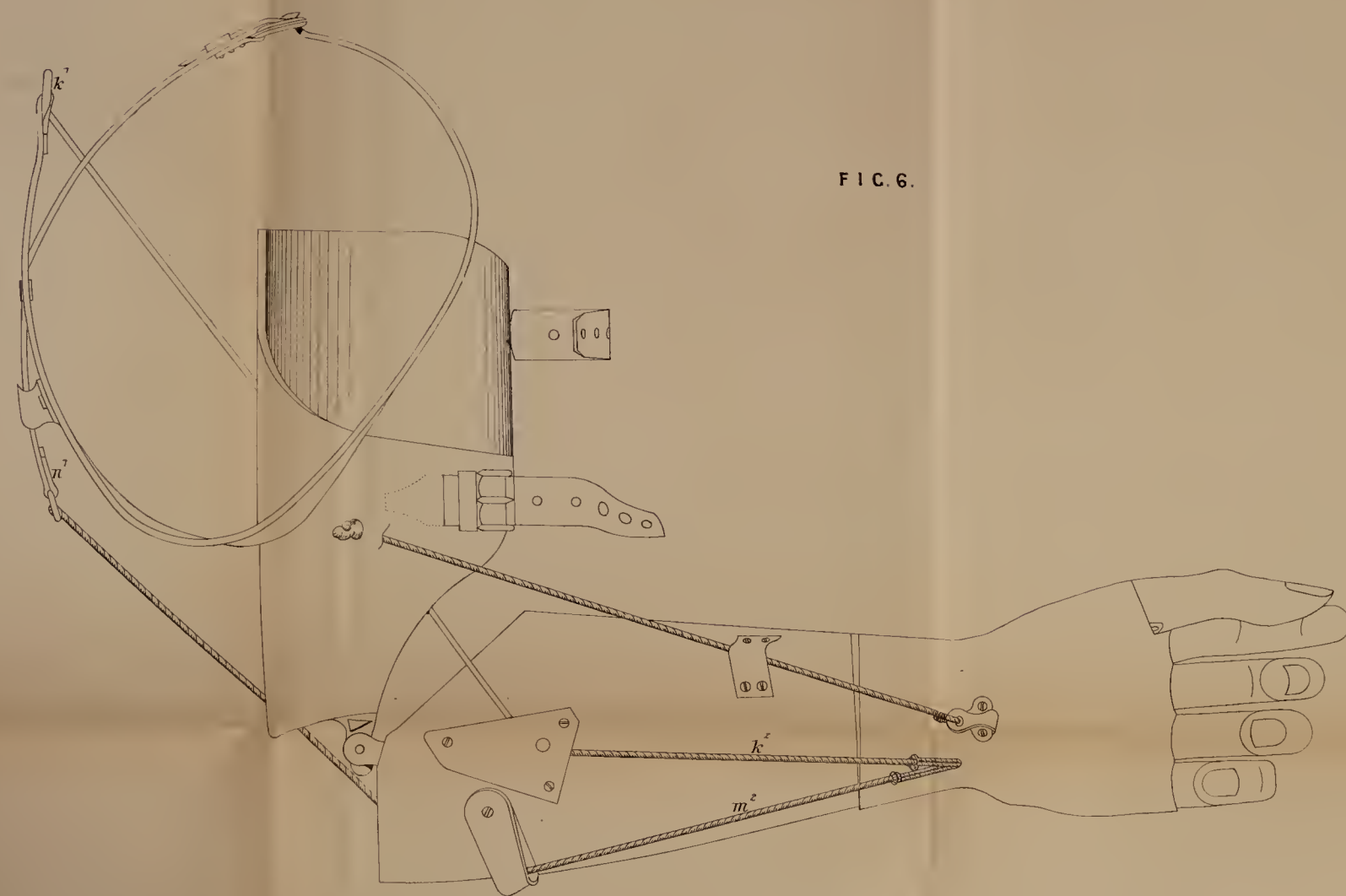


FIG. 6.



FIG. 10.

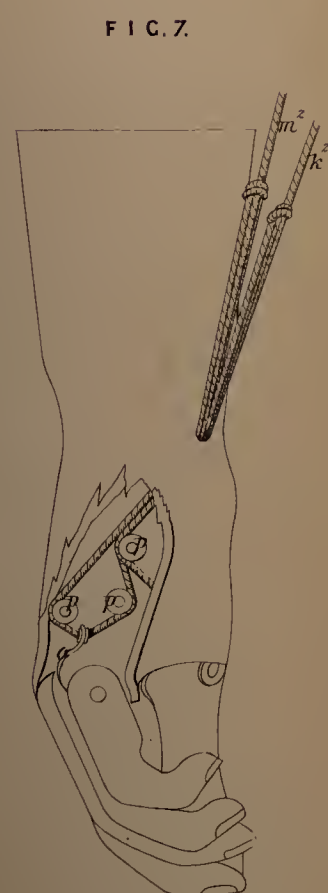


FIG. 7.

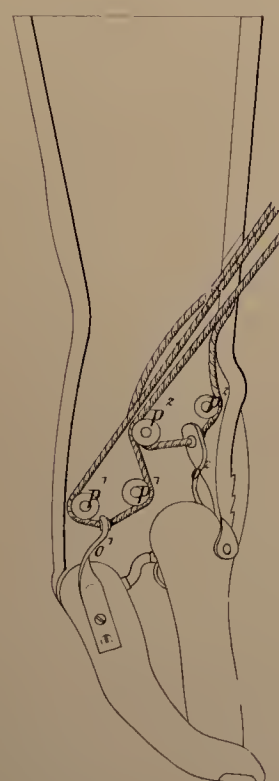


FIG. 8.

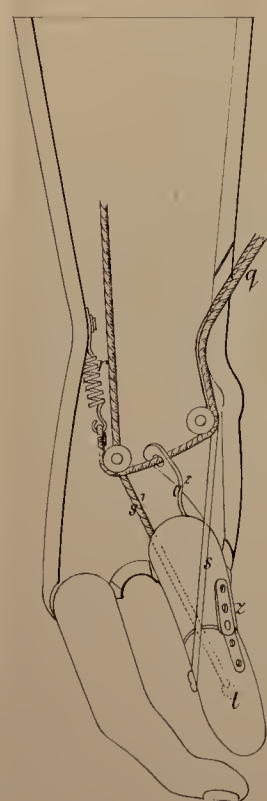


FIG. 9.





